Arhiv za Higijenu Rada i Toksikologiju 2012 vol.63 N3, pages 345-356

COPD and occupation: A retrospective cohort study of industrial workers

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Abstract

The aim of this paper was to ascertain chronic obstructive pulmonary disease (COPD) prevalence among industrial workers in the Russian Federation and determine relative contribution of smoking and occupational factors to COPD. We recruited 1,375 workers aged 30 or over. Six hundred and twenty-four of them were occupationally exposed to vapours, gases, dust, and fumes (VGDF). Physical examination and baseline spirometry were performed for all the participants of the study. Those with airflow limitation of FEV1/FVC<0.70 were considered having COPD and those with presence of cough and sputum production for at least three months in each of two consecutive years were considered having chronic bronchitis (CB), with no overlapping between these 2 groups. Data on occupational history and VGDF levels in the working area were collected from all participants. In total, 105 cases of COPD and 170 cases of CB were diagnosed in the cohort of examined workers. Occupational exposure to VGDF was twice as often present among COPD patients than among both patients with CB and the control group of healthy workers ($p<0.05$). More than 40 % of COPD patients were occupationally exposed to VGDF above the value of 3.0 of the occupational exposure limit (OEL) and more than 20 % to 6.0 OEL and higher. Overall odds ratio for COPD development due to occupational VGDF exposure was 5.9 (95 % CI=3.6 to 9.8, $p=0.0001$). Both smoking and VGDF seem to be important for the development of COPD. Analysis of the combined effect of tobacco smoking and occupational noxious particles and gases on COPD development has shown the following order of risk factors based on the strength of their influence: VGDF levels, smoking index, age, and heating microclimate. There is a statistically significant level of relationship and "dose-effect" dependence between occupational exposures to VGDF and the development of COPD. The effect of VGDF composition on the probability of COPD development was not found in the study. Results of this study were used to substantiate the inclusion of COPD into the National List of Occupational Diseases of the Russian Federation.

http://dx.doi.org/10.2478/10004-1254-63-2012-2178

Keywords

Chronic obstructive pulmonary disease, Occupational exposure, Risk assessment, Silica dust, Smoking